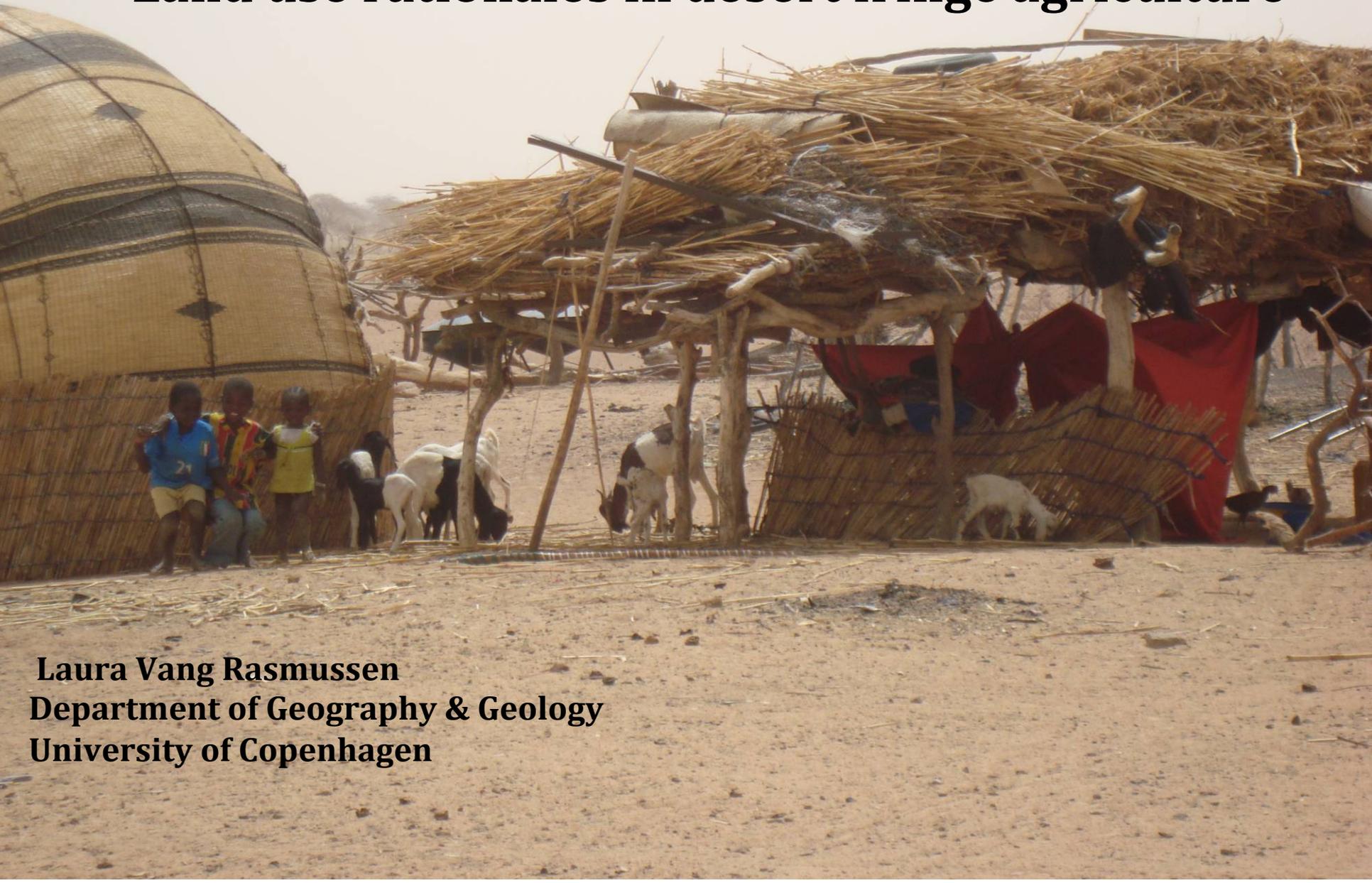


Land use rationales in desert fringe agriculture



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Presentation outline

- **Research questions and aims**
- **Study site: Northern Burkina Faso**
- **Collecting data on land use and rationality in the case area**
 - How to link villagers land use strategies with rationality?
- **Findings: main rationales behind villagers land use decisions**
 - Has there been a temporal shift in the importance of specific forms of land use rationality?

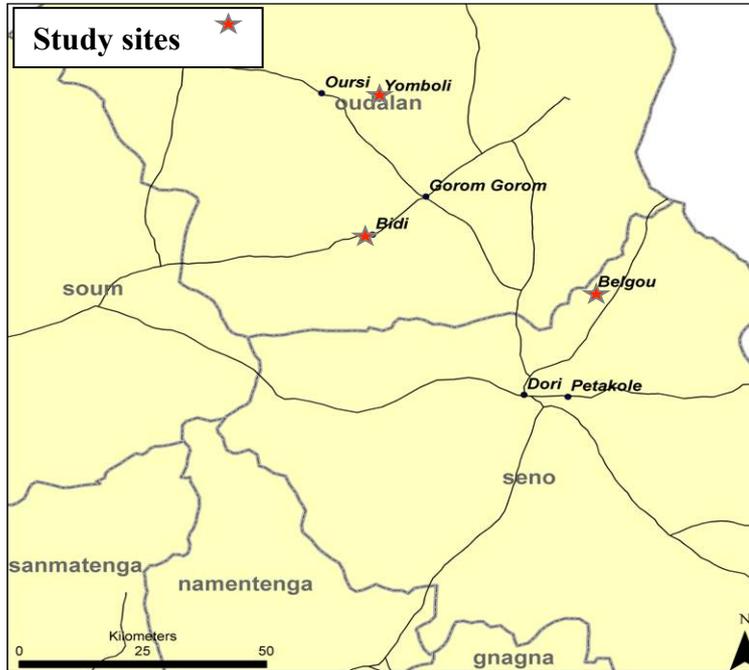


Research questions

1. What land cover changes occurred during the period 1955-2010?
2. How can these land cover changes be linked to individual rationales and large scale driving forces?
3. What are the main objectives when villagers decide to expand, decrease or maintain the size of the field area, and do these objectives correspond to specific forms of rationality of an economic, sociocultural or ecological nature?
4. Has there been a temporal shift in the importance of these specific forms of land use rationality?



The study area: Yomboli



Some facts about Yomboli

- An agro-pastoral system
- Millet is the main crop
- Cattle held a special place among villagers
- Crop residues are an important fodder resource
- Circular migration to Abidjan in the dry season
- Population increase from 825 in 1995 to 1040 in 2010



Collecting data on rationality

Data on changes in the cultivated area during the period 1955-2010

- GPS measurements: *1995, 2009 and 2010*
- Aerial photos: *1955*
- Satellite images: *1988 and 1991*

Data on the land use strategies embraced by villagers and the arguments for embracing the strategies

- Focus groups: *snapshot in 1995, 2009 and 2010 and the period 1955-2010*
- Questionnaires: *snapshot in 2010 and the period 1975-2010*
- Semi-structured interviews: *snapshot in 1995, 2009 and 2010 and the period 1955-2010*



Individual land use decisions: different forms of rationality

Literature review of approaches that seek to understand why villagers do as they do in an African context

3 broad categories of rationality came up:

- **Economic rationality**
 - "Consistent preference for more income over less strongly shapes behaviour" (Bates, 1976)
- **Sociocultural rationality**
 - Cultural traditions and knowledge should not be considered as a limitation to 'rational' development (e.g. Vanclay, 1993)
- **Ecological rationality**
 - "farmers are obliged to adopt a certain survival mechanism that guarantee an uninterrupted flow of goods... from ecosystems" (Toledo, 1990)

2 cross-cutting objectives:

- **The risk minimizing peasant**
 - "peasants are of necessity, risk averse, because they have to secure their household needs from their current production or face starvation" (Lipton, 1968)
- **The optimizing peasant/the satisfying peasant**
 - Peasants decisions are made by converting purchased goods and services as well as own resources into values. Peasants are assumed to maximize utility through the consumption of all available commodities (e.g. Scoones & Toulmin, 1995, Simon, 1982)



A framework for analyzing land use rationales in Sahel

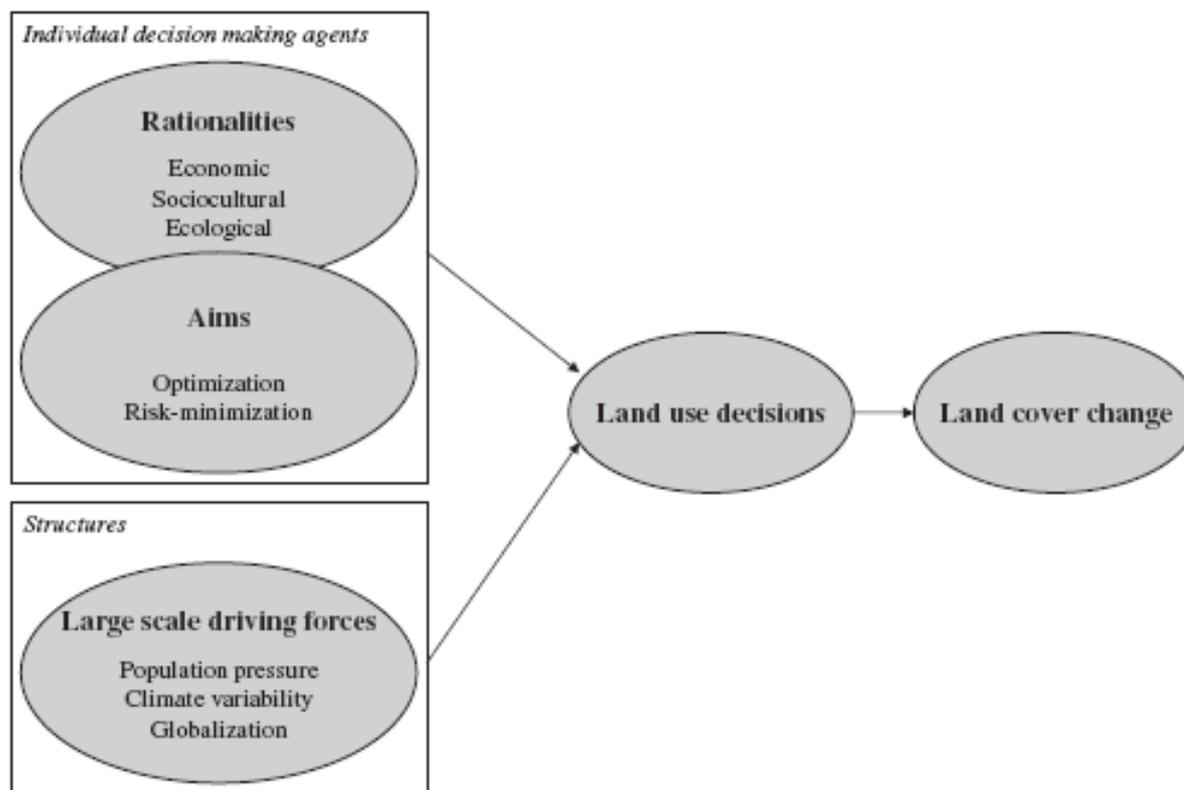


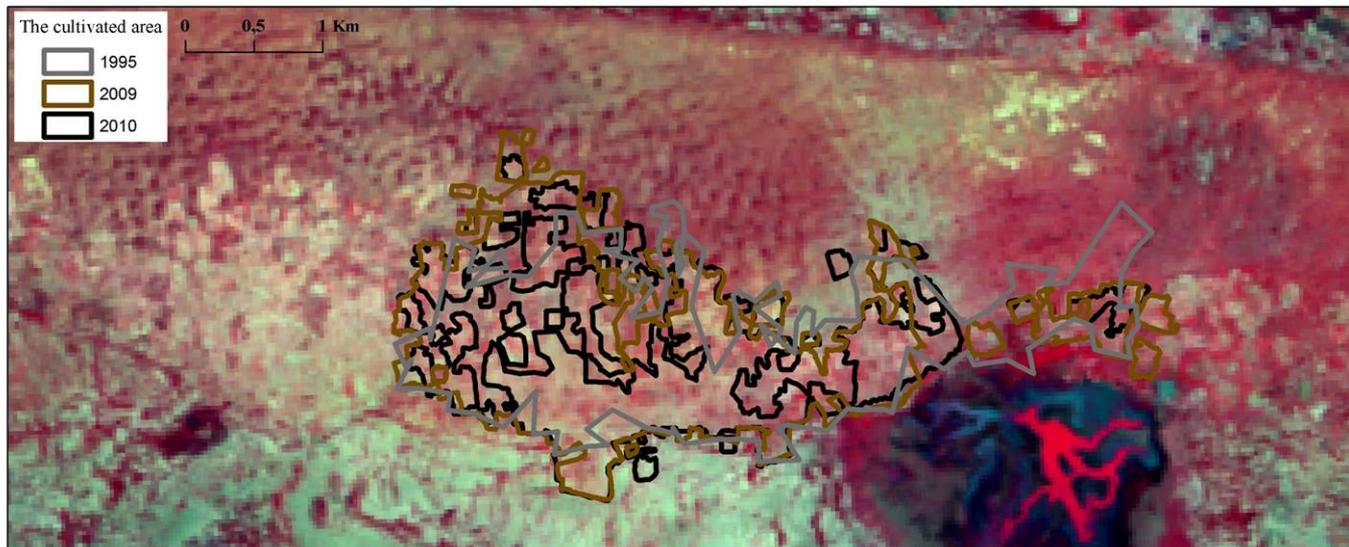
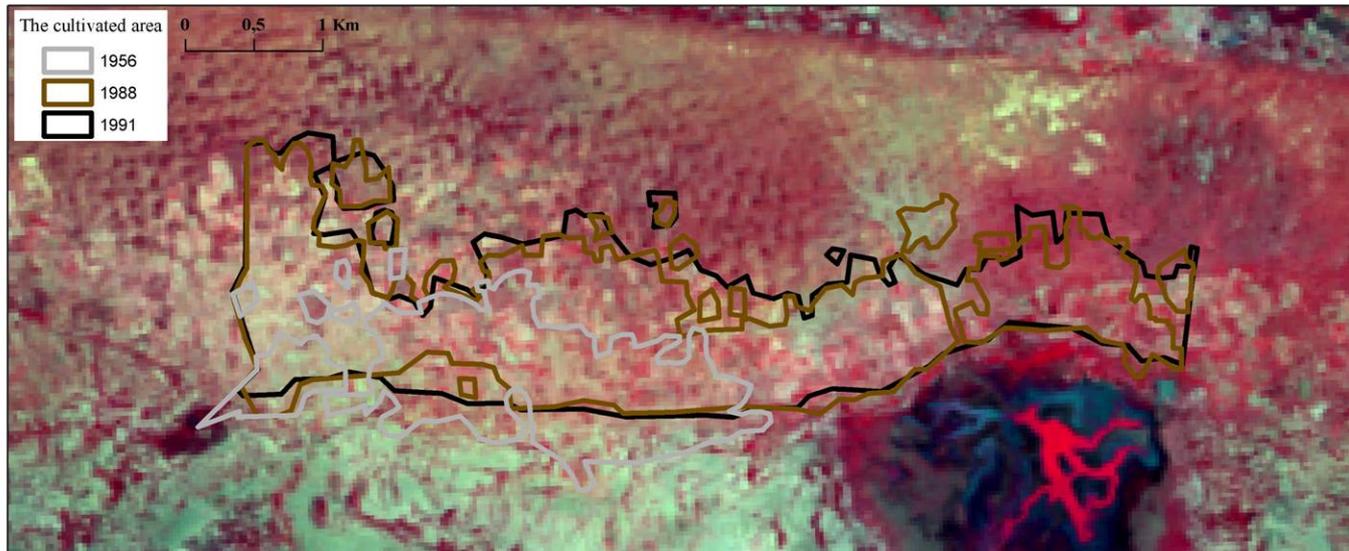
Fig. 1. A framework of the interplay between large scale drivers of change, individual land use decisions and the resulting land cover changes in Sahelian land use systems.

Analyzing the collected data

- Analysis of changes (ha) in cultivated area based on aerial photos, satellite images and GPS measurements, 1956-2010
- Coding of villagers arguments for embracing a certain land use strategy according to the 3 categories of rationality and 2 cross-cutting objectives.
- Embraced strategies may be anchored in several rationales at the same time!



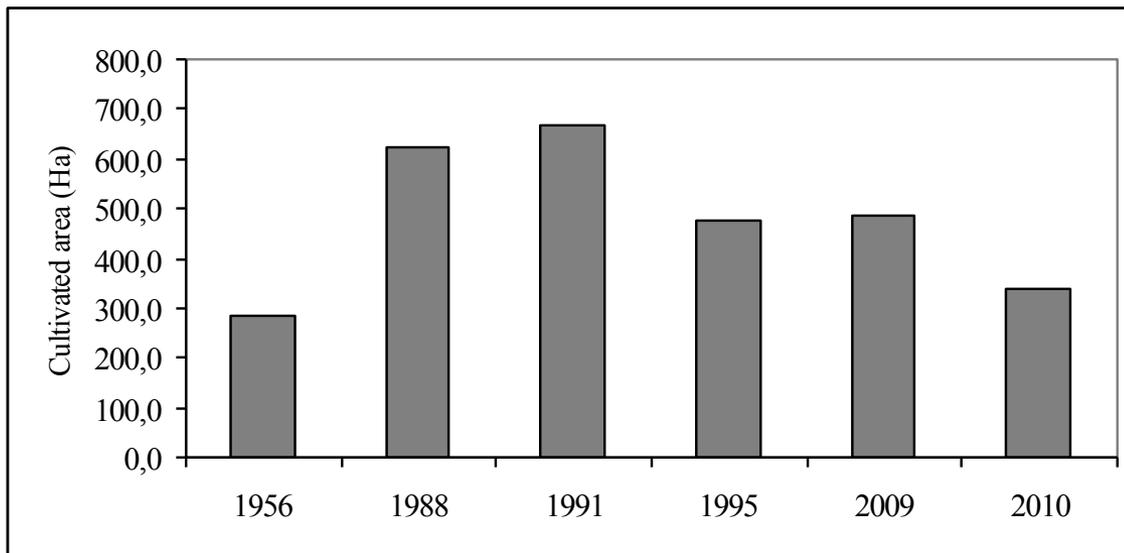
Findings: Changes in the location of cultivated fields during the period 1955-2010



Findings: Changes in the cultivated area during the period 1955-2010

3 waves of land cover change:

- A period of field expansion: 1956-1991
- A period of field contraction: 1991-1995
- A period of both expansion and contraction: 1995-2010



Findings: Shifting rationales during three waves of land cover change

Period	Land use decisions	Rationalities	Cross-cutting objectives	Prominent drivers in the decision environment
1956 - 1991	Expansion of field area	Economic	Optimization: Food security for humans	Population growth
1991-1995	Contraction of field area	Economic	Risk minimization: Food security for livestock	Population growth Globalization
1995-2010	Expansion and contraction of field area	Economic Sociocultural	Risk minimization: Food security for livestock	Population growth Globalization Climatic variability

1956-1991, Expansion of fields:

- **Economic rationality and optimization:** “Back then more children meant more labour; we could cultivate large fields as we were not hungry and we had to fulfil the food requirements”

1991-1995, Contraction of fields:

- **Economic rationality:** “Cultivating many fields was hard work; it was not worth the effort when millet could be bought very cheap”
- **Risk minimization:** “A small cultivated plot is important as it gives crop residues for the animals. You never know if there is enough fodder”
- **Optimization:** “The previous dependency on cultivation has been replaced by a dependency on cash income from migration, so no it is not a strategy to diversify risks. We migrate because we have to earn money to buy fodder!”



1995-2010: Expansion and contraction

	Land use decisions	Fraction of villagers taking the decision	Rationalities	Cross-cutting rationalities
Dry years	<i>Expansion</i>	7%		
	<i>Decrease</i>	44%	Economic	Risk minimization: Food security for livestock
	<i>No change</i>	49%	Economic Sociocultural	Risk minimization: Food security for livestock
Rainy years	<i>Expansion</i>	72%	Sociocultural	Risk minimization: Food security for livestock
	<i>Decrease</i>	5%		
	<i>No change</i>	23%		

Dry years: Abandoning and maintaining fields

Economic rationality: “we quite the hard work in the fields, so we have more energy for the approaching work in the off-farm season and next years agricultural work”

“Lack of rain in august will probably ruin the millet so it is not worth the effort”

Risk minimization: ” We would never give up on the whole area, - you need to have some crop residues for the animals when fodder conditions are uncertain!”

Rainy years: Expansion of fields

Sociocultural rationality: “A large well-cultivated field and more importantly a big harvest show superiority to neighbouring households”

Risk minimization: ” Fodder conditions are uncertain even in good years, - crop residues are so important!”



Main conclusions

1. Villagers' decisions on field size were not based solely on economic judgements of cost and benefit.
 - On the contrary, land use decisions were anchored in two broad rationality categories: economic and sociocultural rationality.
 - Surprisingly, ecological rationality was not prominent.
2. The influence from different rationalities has shifted during the three waves.
 - Economic rationality underpinned individual land use decisions during the first two waves of land cover changes
 - - but it was accompanied by sociocultural rationality in the third wave.
3. The aim of farming moved beyond food production during the second wave as fodder security for livestock overruled the importance of food security for humans.
 - Villagers do not intensify crop production, and it has been shown that they minimize risk by maintaining a small field with crop residues.
 - Contrastingly, the engagement in off-farm activities is not explained by risk minimization. The common image in the scientific literature of West African farmers who minimize risk by diversifying income through off-farm activities may thus be misleading.
4. The interplay between large scale driving forces, individual land use decisions and the resulting land cover changes has been altered.
 - Earlier land cover changes were primarily propelled by the driver of population growth
 - - but recent land cover changes seem to be more influenced by individual rationales than by large scale driving forces.
 - For example, field expansion during the last decade was undertaken for individual reasons of prestige rather than influenced by population growth and globalization.





The study is part of the LASYRE project: www.lasyre.dk lead by Professor Anette Reenberg

For more information on the study:

Rasmussen, L.V. & Reenberg, A. (2012):

Land use rationales in desert fringe agriculture. *Applied Geography* 34: 595-605

